Single-Frequency Semiconductor Lasers Operating at 1.5 and 2.0 microns, Phase I

Completed Technology Project (2009 - 2009)

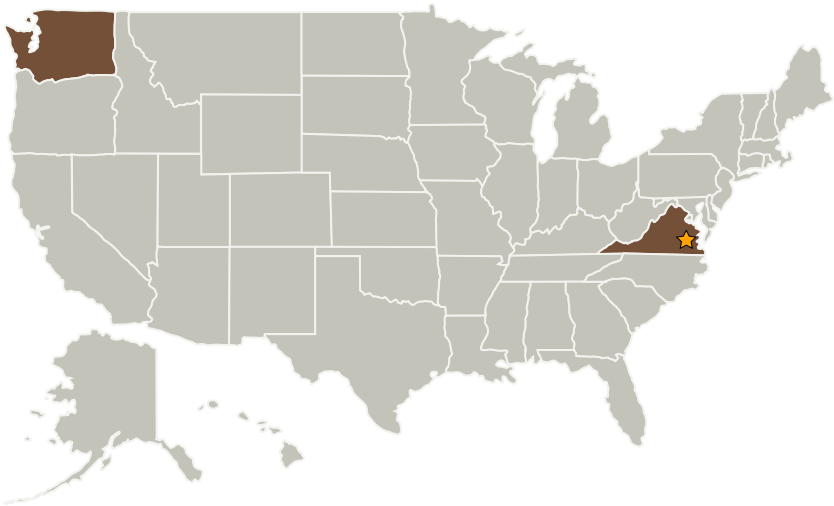
Project Introduction

While conventional injection seeding sources (such as DFB diode lasers and rare-earth doped solid-state microchip lasers) are available at 1.5 microns, these sources typically lack the ultra-narrow (<50 kHz), ultra-stable output spectrum required for use in applications such as Doppler shift measurements of the tropospheric winds. Furthermore, similar sources which operate at 2.0 microns (a preferred wavelength for space-based atmospheric measurements) are simply unavailable. To fill this need, nLight proposes the parallel development of 1.5 and 2.0 micron injection seeding sources based on our well-established, wavelength-scalable, industry-leading InP semiconductor laser design.

Anticipated Benefits

Potential Non-NASA commercial applications include narrow-linewidth eyesafe pump sources for: 1. Military Infrared countermeasures, eyesafe rangefinders, eysafe 3D LIDAR imaging for surveillance, and unmanned autonomous ground and airborne vehicles 2. Medical Tissue bonding, dentistry Potential NASA commercial applications include: 1. Ultra-narrow linewidth LIDAR injection-seeding sources for Doppler shift measurements of the tropospheric winds. 2. Narrow-linewidth eyesafe pump sources for 3D LIDAR imaging for autonomous precision landing including hazard detection and avoidance

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
★Langley Research Center(LaRC)	Lead Organization	NASA Center	Hampton, Virginia
nLight Photonics Corporation	Supporting Organization	Industry	Vancouver, Washington

Primary U.S. Work Locations	
Virginia	Washington

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Langley Research Center (LaRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Farzin Amzajerdian

Principal Investigator:

Paul Leisher

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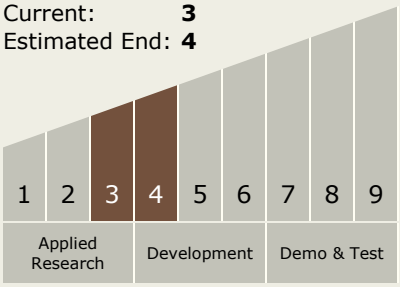
Technology Maturity (TRL)

Start: **3**
Current: **3**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers